10

CLAIMS

What is claimed is:

1.   A method for automatically equalizing an audio signal, the method comprising: measuring spectral energy values for a plurality of frequency bands; determining spreaded energy values for each frequency band based on the measured spectral energy values and a spreading function, the spreading function defining a spread of spectral energy across frequency bands; and updating equalizer settings for each frequency band based on the measured spectral energy values and the spreaded spectral energy values.

2.   The method of claim 1, wherein the step of measuring comprises: measuring frequency components for at least a portion of the audio signal; and equalizing each frequency component using the equalizer setting associated with the corresponding frequency band.

3.   The method of claim 2, further comprising prefiltering the measured frequency components with an inverse of an equal loudness curve prior to equalizing each frequency component.

4.   The method of claim 1, wherein the step of updating comprises updating the equalizer settings based on a ratio of the measured spectral energy values and the spreaded spectral energy values.

5.   The method of claim 1, further comprising using the updated equalizer settings to amplify corresponding frequency bands of the audio signal.

6.   The method of claim 5, wherein the step of using comprises using a fraction of the updated equalizer settings in the decibel domain to amplifying the audio signal.

7.   The method of claim 6, wherein a smaller fraction of the updated equalizer settings are used for low and high frequency bands than for midrange frequency bands.

8.   The method of claim 1, wherein the method is performed in response to actuation of a button for controlling initiation of automatic equalization.

9.   The method of claim 1, wherein the method is performed in response to actuation of a knob for controlling equalization strength.

10.   A system for automatically equalizing an audio signal, the system comprising: means (120, 130, 140) for measuring spectral energy values for a plurality of frequency bands; means (150) for determining spreaded energy values for each frequency band based on the measured spectral energy values and a spreading function, the spreading function defining a spread of spectral energy across frequency bands; and means (160, 170)

for updating equalizer settings for each frequency band based on the measured spectral energy values and the spreaded spectral energy values.

11.   The system of claim 10, wherein the means (120, 130, 140) for measuring comprises means (120) for measuring frequency components for at least a portion of the audio signal; and means (130) for equalizing the frequency components using the equalizer setting associated with the corresponding frequency band.

12.   The system of claim 11, further comprising means (120) for prefiltering the measured frequency components with an inverse of an equal loudness curve prior to equalizing each frequency component.

13.   The system of claim 10, wherein the means (160, 170) for updating comprises means (160) for determining the equalizer settings based on a ratio of the measured spectral energy values and the spreaded spectral energy values.

14.   The system of claim 10, further comprising means (180) for using the updated equalizer settings to amplify corresponding frequency bands of the audio signal.

15.   The system of claim 14, wherein the means (180) for using comprises means (180) for using a fraction of the updated equalizer settings in the decibel domain to amplify the audio signal.

16.   The system of claim 15, wherein a smaller fraction of the updated equalizer settings are used for low and high frequency bands than for midrange frequency bands.

17.   The system of claim 10, further comprising a button for initiating automatic equalization.

18.   The system of claim 10, further comprising a knob for controlling equalization strength.

19.   A method for automatically equalizing an audio signal, the method comprising: measuring spectral energy values for a plurality of frequency bands; comparing the measured energy values with a predetermined spectral energy distribution; and updating equalizer settings for each frequency band based on the comparison between the measured energy values and the predetermined spectral energy distribution.

20.   The method of claim 19, wherein the step of measuring comprises: measuring frequency components for at least a portion of the audio signal; and equalizing each frequency component using the equalizer setting associated with the corresponding frequency band.